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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,536	02/17/2006	Kohei Suzuki	043888-0439	4534

53080 7590 05/27/2009

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EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
05/27/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,536	SUZUKI ET AL.	
	Examiner	Art Unit	
	CYNTHIA LEE	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Priority

Acknowledgement has been made of applicant's claim for priority under 35 USC 119 (a-d). The certified copy has been filed on 2/17/2006.

Information Disclosure Statement

The Information Disclosure Statement (IDS) filed 2/17/2006 has been placed in the application file and the information referred to therein has been considered.

Drawings

The drawings received 2/17/2006 are acceptable for examination purposes.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-10, 13, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0037450) in view of Delnick (US 5948464).

Suzuki discloses a lithium ion secondary battery comprising: a positive electrode capable of absorbing and desorbing lithium ion; a negative electrode capable of absorbing and desorbing lithium ion; a porous film interposed between said positive electrode and said negative electrode; and a non-aqueous electrolyte. Suzuki discloses a binder for the negative electrode as carboxymethylcellulose and styrene-butadiene rubber with 1.6 parts per 100 parts of active material (Applicant's claims 1 and 7).

Suzuki discloses a porous film, but does not disclose a film comprising an inorganic filler and a first binder, a content of said first binder in said porous film being 1.5 to 8 parts by weight per 100 parts by weight of said filler, said first binder comprises a first rubber including an acrylonitrile unit, said first rubber being water-insoluble and having a decomposition temperature of 250.degree. C. or higher (Applicant's claim 1). Delnick teaches a separator comprising solid particulate 32, such as silica, alumina, and titania (6:49) and a binder 34 (7:5-15). The separator provides good performance in a very thin thickness regime, thereby allowing cell scalability to dimensions previously unattainable and performance surpassing that of prior separators that contain particulate reinforcements (6:20-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the separator of Suzuki of inorganic solid particulate as taught by Delnick for the benefit of obtain a good performing separator with thin dimensions. The ratio of binder to solid particulate is 5/95 to 10/90 (7:27). MPEP states that prior art which teaches a range overlapping or touching the claimed range anticipates if the prior art range discloses the claimed range with "sufficient specificity." See 2131.03.

Regarding claim 9, Delnick does not expressly teach a surface of said inorganic oxide has a BET specific surface area. It is noted that surface area (m^2/g) is equal to 1/(density*length) or m^3/(mass*length). It is also noted that density is constant. Delnick teaches that that solid particulate size ranges from 0.01 um to 1.0 um (6:65-67). Delnick teaches that modifications can be made to the mixture to improve its dispersion and sizes suitable for the preferred printing processes (7:1-5). It would have

been obvious to one of ordinary skill in the art at the time the invention was made to modify the particle size of the solid particulate for the benefit of obtaining a good dispersion.

Regarding claim 14, Delnick teaches the separator thickness as being between 5-100 um (9:17). In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP 2144.05.

Delnick does not disclose said first binder comprises a first rubber including an acrylonitrile unit, said first rubber being water-insoluble and having a decomposition temperature of 250.degree. C. or higher per se (Applicant's claim 1). Suzuki discloses a core-shell type rubber particle comprising an acrylonitrile unit in a positive electrode [0032]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the binder as a separator binder as well since it has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). Se MPEP 2144.07. The core-shell type rubber particle comprising an acrylonitrile unit has a binding surface because it is used as a binder.

Regarding claim 13, said positive electrode 2 and said negative electrode 3 are wound with said porous film 4 interposed therebetween. See fig. 1 of Suzuki.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0037450) in view of Delnick (US 5948464) as applied to claim 1, further in view of Ota (US 6365300).

Suzuki modified by Delnick teaches all the limitations of claim 1 and are incorporated herein. Suzuki modified by Delnick does not disclose wherein a surface roughness of said porous film is less than a surface roughness of an electrode surface to which said porous film is adhered to. Ota teaches that surface roughness (Rmax) of the negative electrode affects the battery performance considerably. It is desirable that the value of Rmax be not less than 0.01 .mu.m and not more than 5 .mu.m. If less than 0.01 .mu.m, good bonding with the electrolytic layer cannot be obtained, resulting in easy separation. In addition, smooth deposition and ionization of the metallic lithium may not be performed at the time of charge and discharge. It appears that the deposition and ionization are affected by the bonding with the electrolytic layer (10:1-10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to roughen the surface of the electrodes of Suzuki for the benefit of good bonding between the electrode and the separator.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0037450) in view of Delnick (US 5948464) as applied to claim 1, further in view of Hampden-Smith (US 2002/0168570).

Suzuki modified by Delnick teaches all the limitations of claim 1 and are incorporated herein. Suzuki modified by Delnick does not disclose a mixture of a large

particle group and a small particle group of the inorganic filler. Hampden-Smith teaches of providing a battery powder batch having a bimodal particle size distribution. That is, the powder batch can include battery particles having two distinct and different average particle sizes. A bimodal particle size distribution can enhance the packing efficiency of the powder which is important for use as a battery electrode [0168]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the inorganic fillers of Delnick with two distinct particle sizes as taught by Hampden-Smith for the benefit of good packing ability.

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0037450) in view of Delnick (US 5948464) as applied to claim 1, further in view of Daroux (US 6562511).

Suzuki modified by Delnick teaches all the limitations of claim 1 and are incorporated herein. Suzuki modified by Delnick does not disclose a separator is further interposed between said positive electrode and said negative electrode. Daroux teaches a separator for a Li-ion polymer battery comprised of a plurality of separator layers that are laminated together. The plurality of separator layers including a first layer formed of a first separator material, and a second layer formed of a second separator material, wherein the second layer is compositionally and structurally different from the first layer. See Abstract. The thickness of each separator is about 15 um to about 35 um (4:10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make

the battery of Suzuki of two separators, as taught by Daroux, for the benefit of providing reinforced protection against puncture.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art

Unit 1795